NISTTech

Nanocomposite Material for Magnetic Refrigeration & Superparamagnetic System using the Same

Abstract

A nanocomposite superparamagnetic material that includes nanosize particles of a magnetic component, preferably a rare earth and a transition element, dispersed finely within a bulk matrix component provides finely dispersed magnetic clusters, whereby a high magnetocaloric effect is obtained in using the nanocomposite material in a conventional magnetic refrigeration system. In one aspect of the present invention, an element formed of such a nanocomposite superparamagnetic material is reciprocated into and out of a heat exchanger within a controlled magnetic field and is in heat transfer communication with a second heat exchanger to facilitate the production of a refrigeration heat transfer effect thereby. In another aspect of the present invention, a generally disk-like element formed of the nanocomposite superparamagnetic material is rotated so that portions thereof move between a first heat exchanger and a second heat exchanger that is within a controlled magnetic field, to thereby perform refrigeration heat transfer between the two heat exchangers.

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References

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Status of Availability

This invention is available for licensing.

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